"STEAM BOILERS INSPECTION ACT, 1901."

REGULATIONS

RELATING TO THE

EXAMINATION OF ENGINEERS.

VICTORIA, B. C.:
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Sec. 1. Candidates for examination must fill up a form of application (Form No. 12, which can be obtained by application to the Chief Inspector).

The form must be properly filled in and returned to the Chief Inspector, together with the examination fees, which are as follows:—For certificates of competency, $5 for first examination; $2.50 for examination to be advanced to a higher grade; and for temporary certificates, $2.50. Candidates must be careful to properly fill in the application form, and enter therein copies of certificates and testimonials in support of their claim. Original testimonials are not to be sent with the application form, but they must be produced for the Examiners' inspection before the examination can be proceeded with.

Sec. 2. All candidates must produce testimonials as to workshop time and also as to service as engineers or firemen, such testimonials to be signed by their employer in the case of shop time, and by the employer or the chief engineer in the case of engineer's or fireman's time; testimonials as to workshop time must testify to the candidate's conduct and ability, and state what kind of work he was engaged on, and for how long; testimonials as to service must testify to the applicant's sobriety, experience, ability, and general good conduct for at least twelve months' service preceding the date of application to be examined.

Sec. 3. In cases where testimonials from the employer or the chief engineer are for any sufficient reason not obtainable, the testimony of credible persons having a personal knowledge of the facts required to be established may be put in; the production, however, of such proofs will not of necessity be deemed sufficient. Each case must be decided on its own merits.

Sec. 4. Any person who makes, assists in making, or procures to be made, any false representation for the purpose of procuring either for himself or for any other person a certificate of competency shall, in respect of each offence, be guilty of a misdemeanor, which is punishable, on summary conviction, with imprisonment for a term not exceeding twelve months, or with a fine not exceeding five hundred dollars.

Sec. 5. Foreign engineers must prove to the satisfaction of the Examiners that they can speak and write the English language sufficiently well to perform the duties required of them in operating a steam plant.

Sec. 6. If after a candidate has passed the examination it is discovered on further investigation that his services are insufficient to entitle him to receive a certificate of the grade for which he passed, the certificate will not be granted; but if the Chief Inspector is satisfied that the error did not occur through any fault or wilful misrepresentation on his part, the matter may be referred to the Chief Commissioner of Lands and Works, and should his services entitle him to a certificate of a lower grade, such certificate may be granted.

Sec. 7. If the candidate fails in practical knowledge he may not present himself for re-examination until he can produce proofs of three months' further service as engineer from the date of failure. If he fails in arithmetic, elementary questions or drawing only, he may be re-examined at any convenient time.

Sec. 8. If the candidate passes he will receive a certificate, as provided by sec. 37 or sec. 38 of the Act, as the case may be.

QUALIFICATIONS REQUIRED FOR THE VARIOUS GRADES.

Sec. 9. A candidate for a temporary certificate must furnish satisfactory evidence, by testimonials, as to his character and habits of life, and must also be able to answer the elementary questions, as well as additional questions that may be put to him by the Inspector regarding the operation of the plant for which he requires a certificate.

Sec. 10. A candidate for a fourth class certificate must be at least 18 years of age; he must have served one year as fireman, or as fireman and engineer, of a steam plant of not less than five horse-power; or he must have served twelve months in a workshop on the making or repairing of steam engines, boilers, &c., and six months as fireman or engineer of a steam plant of not less than five horse-power; he must write a legible hand, and must understand the operation of

the feed pump, safety valve and water gauge, and he must understand the importance of keeping boilers clean inside and out, and also the principles of firing, and the general care of engines and boilers.

Sec. 11. A candidate for a third class certificate must be at least twenty years of age ; he must have served two years as engineer of a steam plant of not less than ten horse-power, or three years as fireman; or he must have served two years in a workshop on the making or repairing of engines, boilers, &c., and six months as engineer of a steam plant of not less than 10 horse-power; he must be able to write a legible hand, and have a good knowledge of the first four rules of arithmetic; and in addition to the requirements for a fourth class engineer, he must be able to give a description of engines and boilers, the causes, effects, and usual remedies for incrustation and corrosion, the use and management of the different valves, cocks, pipes and connections; he must be able to pass a creditable examination as to the various constructions of boilers and engines in general use, as to the details of the different parts, external and internal, and the use of each part; and he must be able to state in detail all precautions to be taken in the laying up of a steam plant for a more or less extended period.

Sec. 12. A candidate for a second-class certificate must be at least 21 years of age; he must have served four years as engineer of a steam plant of not less than one hundred horse-power; or he must have served three years in a workshop on the making or repairing of engines, boilers, &c., and one year as engineer of a steam plant of not less than one hundred horse-power; he must write a legible hand, and have a good knowledge of arithmetic up to and including vulgar and decimal fractions and square root; he must understand the application of these rules to questions about safety valves, boiler staying, horse-power calculations, coal and water consumption, &c.

And in addition to the requirements for a third class engineer, he must be able to give a description of the ordinary methods of boiler staying, and be able to calculate the strength of stays and braces; he must be able to explain the method of setting the eccen-

trics, of testing and altering the setting of slide valves, of setting and lining up engines, of setting boilers in brick work, and of making the proper connections as required by the Act; he must understand the use of the steam engine indicator, the proper method of attaching the same to the engine, and he must be able to detect errors in the distribution of steam in the engine cylinders as shown by indicator diagrams, and state how these defects may be remedied; he must also possess a creditable knowledge of the prominent facts relating to combustion, heat and steam.

Sec. 13. A candidate for a first class certificate must be not less than 22 years of age; he must have served five years as engineer in charge of a watch of a steam plant of not less than 300 horse-power; or he must have served four years in a workshop on the making and repairing of engines, boilers, etc., and one year as engineer in charge of a watch of a steam plant of not less than 300 horse-power; he must also have been in possession of a second class certificate for six months; and in addition to the requirements for a second class engineer, he must be able to calculate safety valve pressures, and the strength of boiler shells, stays and riveting; he must be able to calculate the capacity of feed pumps; he must be able to take off and calculate indicator diagrams; he must be conversant with surface and jet condensation, superheating, and the working of steam expansively; he must understand the construction of, and be able to maintain in a working condition, air compressors, ammonia compressors and dynamos of ordinary types; his knowledge of arithmetic must include the extraction of square and cube root, and the application of arithmetical rules to questions relating to power, duty, and economy of engines and boilers, and to stresses in rods, shafts and levers of the engine; he will also be required to make an intelligible hand sketch or a working drawing of some one or more principal parts of a steam engine, and to mark in, without a copy, all necessary dimensions in the figures, so that the sketch or drawing could be worked from; fine drawing is not expected, and a wide margin will be allowed in the proportions of the parts; the drawing must be a

practical working drawing, giving a sufficient number of views to show the parts fully, sections, plans, or elevations, just as the candidate would require to be supplied to him if he had to make the part to the design of another person.

Sec. 14. When the workshop service has been performed in a place where steam engines are not made or repaired, and the class of work done is similar to that required in engine-making, the service may be accepted with an additional year as engineer.

Sec. 15. When the workshop service has been performed in a place where engines are made or repaired, and the candidate has no service as engineer, the service may be accepted in lieu of engine-room service, with three years' additional workshop service, provided the Chief Inspector is satisfied that the workshop service has been such as would fit the candidate for a position as engineer of the grade for which the application is made.

Sec. 16. Engineer in charge of a watch means being on watch for at least eight hours per day, and being responsible for the regulation of the feed water and the general supervision of the boilers and engines during such period.

Conduct of Examinations.

Sec. 17. The examinations will commence at 10 o'clock a.m., and will close at 4 o'clock p.m., and will continue from day to day until all the candidates whose names appear upon the Examiners' list have been examined.

Sec. 18. Candidates will be notified of the date set for their examination, and they must appear at the examination room punctually at the time appointed.

Sec. 19. Before commencing the examination, the tables and desks are to be cleared of all scrap paper, or books that are not used in the examination, and care should be taken that the candidates do not bring into the examination room any book or paper.

Sec. 20. No person will be allowed in the examination rooms during the examinations, other than those whose duties require them to be present.

Sec. 21. All books necessary for the use of the candidates under examination will be provided; and drawing boards and T squares for the use of candidates who are being examined for first class certificates will also be provided, but the applicants will have to bring with them any drawing instruments they may require.

Sec. 22. In the event of any candidate being discovered referring to any book or paper, or copying from another, or affording any assistance, or giving any information to another or communicating with another, during the time of examination, or copying any part of a question for the purpose of taking the same out of the examination rooms, he will subject himself to the penalties of a failure, and will not be allowed to be re-examined for a period of six months.

Sec. 23. No candidate may leave the room during the examination without permission and without giving up the paper on which he is engaged. Under no circumstances will the same paper be returned to him, but the Examiner may substitute other data or other questions.

Sec. 24. Any candidate violating any of these regulations or any other regulations regarding examinations, or being guilty of insolence to the Examiner, or of disorderly or improper conduct in or about the examination rooms, will render himself liable to the postponement of his examination, or, in the event of his having passed, to the detention of his certificate for such period as the Board may direct.

Sec. 25. The examination of candidates for temporary certificates will consist of elementary questions and viva voce, together with such other questions as in the opinion of the Examiner should be answered by an engineer in charge of the plant for which the certificate is required.

(*b.*) For fourth class certificates the examination will consist of two parts, elementary questions and viva voce :

(*c.*) For third class certificates the examination will consist of arithmetic, elementary questions, and viva voce:

(*d.*) For second class certificates the examination will consist of arithmetic, elementary questions, and viva voce:

(*e.*) For first class certificates the examination will consist of arithmetic, drawing, elementary questions, and viva voce.

Sec. 26. All applicants presenting themselves for examination will be required to give written answers to ten questions selected from the Elementary Questions, Appendix B. These questions are intended to furnish a record to some extent of the candidate's knowledge at the time of his examination. The questions for all classes of engineers will be taken from the same series of Elementary Questions, and candidates for the higher grades are expected to show their superiority by giving answers more complete than those for the lower grades.

Sec. 27. When the verbal examination is held the Examiners will deal with practical, rather than theoretical, questions; and no candidate should be failed in this division of the examination without having been well cross-questioned on the points of which failure takes place, and a written account of the points failed in must be forwarded to the Chief Inspector, with the elementary papers and the Report Form No. 15.

Sec. 28. Reports of examinations on the Form No. 15, together with the examination papers, are to be forwarded by the Examiner to the Chief Inspector as soon as the examinations are completed.

Duties and Liabilities of Engineers.

Sec. 29. The Chief Engineer of a steam plant will be held accountable to the Department for the proper care and management of the boilers and machinery under his charge; he must report all accidents and casualties to the Inspector of the district, as required by sec. 31 of the Act, and he is required to report to the owners and to the Inspector any defects that he may have discovered, by which the safety of the boilers or machinery may be endangered.

Sec. 30. It is the duty of an engineer, when he assumes charge of a steam plant, to thoroughly exam-

ine the boilers and engines, and, if necessary, to report to the Inspector, as required by sec. 42 of the Act.

Sec. 31. It is the duty of every engineer who assumes charge, or vacates his position as engineer, to notify the Inspector, as required by sec. 43 of the Act.

Sec. 32. It is clearly the duty of the engineer to see, in the intervals between the inspections, that all the safety valves, as well as the rest of the machinery, are in proper working order; there is no provision in the "Steam Boiler Inspection Act" exempting him, on the grounds that the steam plant has been inspected by a Government Inspector, from any liability, civil or criminal, to which he would otherwise be subjected; and he must fully satisfy himself regarding the safety valves that they are every one, and at all times, in good working order while the boilers are under steam, and that they do not permit of more pressure being carried than that allowed by the certificate of inspection. See sec. 17 of the Act.

Sec. 33. Engineers must exhibit their certificates, together with a copy of the duties and liabilities of engineers, properly framed and protected by glass, in the engine room.

W. C. WELLS,
Chief Commissioner of Lands and Works.

Lands and Works Department,
Victoria, B.C., 15th January, 1902.

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